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AIRBORNE OBSERVATORY'S TELESCOPE WEIGHT REDUCED

NASA's Stratospheric Observatory for Infrared Astronomy (SOFIA) project team has achieved a major milestone toward completing the world's largest airborne observatory.

French engineers reconfigured the 2.7-meter primary mirror of the telescope to be light enough to meet the stringent weight requirements of an airborne telescope, yet strong enough to withstand the open-cavity environment it will experience mounted in a highly modified Boeing 747SP flying at nearly 41,000 feet.

"This is the largest telescope mirror ever to be lightweighted using a mechanical cutting process," said SOFIA Chief Scientist Eric Becklin of the Universities Space Research Association. "There were definitely some technical challenges and some risk of damaging the mirror. However, the mirror came through in excellent condition, and we can now move on to the more conventional figuring process."

The painstaking lightweighting process required removing over 3,600 kilograms (approximately 7,900 pounds) from the back of the SOFIA primary mirror. During the nearly 18-month process, the mirror's weight was reduced by over 80% from 4,500 kilograms (9,922 pounds) to 880 kg (1,940 pounds). The lightweighting procedure, that used a huge, high-precision milling machine, resulted in a strong, lighter-

weight mirror with a honeycomb back.

Schott Glasswerke of Mainz, Germany cast the mirror blank. Engineers at the French company, REOSC, are now beginning to grind and polish the front surface of the mirror. This phase is expected to take approximately a year. REOSC has produced primary mirrors for the European Southern Observatory's Very Large Telescope (VLT) and the international Gemini project.

The SOFIA mirror will be figured to a focal ratio of f:1.28. The complete telescope system, a Cassegrain with Nasmyth focus, will have a focal ratio of f:19.6. It will operate primarily in the infrared and submillimeter region of the spectrum, from .8 to 1,600 microns, but will also be used in visible wavelengths. The entire telescope assembly is expected to weigh about 20,000 kilograms (approximately 44,000 pounds).

Under an international agreement between the United States and the German government, the German Aerospace Center (DLR) is responsible for the design and construction of the SOFIA telescope. In return for supplying the telescope and part of the ongoing funding of the observatory operation, the Germans will receive 20% of SOFIA's observing time to allocate to its science community. A consortium of MAN Technologie and Kayser-Threde companies in Germany is designing and building the telescope for the DLR.

SOFIA, with its 2.7-meter (106-inch) telescope, is NASA's next generation airborne observatory, replacing the now-retired Kuiper Airborne Observatory that had a .9-meter (36-inch) telescope. SOFIA will be based at NASA's Ames Research Center at Moffett Field, CA, and is expected to become operational in 2002. From its 41,000-foot vantage-point, astronomers will be above more than 99% of the infrared-absorbing atmospheric water vapor that limits what they can study using ground-based observatories.

SOFIA will provide an excellent platform for the study of black holes, galactic evolution, the chemical composition of interstellar gas clouds, complex organic molecules in space, and how stars and solar systems form. SOFIA is being developed, and will be operated for NASA by a consortium led by the Universities Space Research Association.

For more information about SOFIA, visit the SOFIA home page located at <http://sofia.arc.nasa.gov>

Color images with captions to accompany this story are available at the SOFIA web site:
<http://www.sofia.usra.edu/project/library/gallery/mirror.html>

Additional background about SOFIA is located at

http://www.sofia.usra.edu/news/pr_releases/971218_press_backgrounder.html

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